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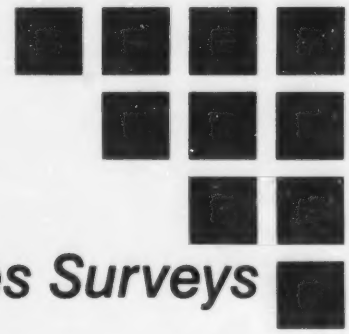


The National Graduates Surveys

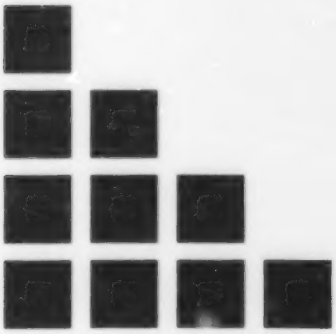
1990 Bachelor's Graduates Who Pursue Further Post-Secondary Education

R-00-1-4E

by
George Bultin

1999

Research Paper



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Applied Research Branch
Strategic Policy
Human Resources Development Canada

Direction générale de la recherche appliquée
Politique stratégique
Développement des ressources humaines Canada

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▬

This report is part of a set of research studies on the National Graduates Surveys. /
Le présent rapport fait partie d'un ensemble d'études sur les Enquêtes nationales auprès de diplômés.

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Abstract

Nearly 60% of 1990 bachelor's graduates had taken or completed some further post-secondary education by 1995, five years after graduating. Over three-quarters of graduates who took further post-secondary education did so by 1992, within two-years after graduation. Nearly a third of graduates who took further post-secondary education took master's or doctoral programs, while close to a quarter of students took programs at either the college/trade-vocational or bachelor's degree level.

This study contributes to the research literature on life-long learning by examining the population of Canadian university students who pursued further/additional post-secondary education after graduating from bachelor's level programs in 1990, using data from the 1992 National Graduates Survey of 1990 graduates (NGS) and the 1995 Follow-up of 1990 Graduates Survey (FOG). This study examines how social demographic and enrolment-related factors affect the odds of pursuing different types of further post-secondary education.

- Field of study was found to be a key predictor of participation in further post-secondary education, controlling for other predictors. Graduates from fields of study that had a specific job associated with them, such as education, commerce, management and business, engineering, and health professions had lower odds of participation in further post-secondary education than graduates from social science programs.

- Men had higher odds of participation in master's and doctoral programs than women, controlling for other predictors.

- Graduates whose parents had a university degree had higher odds of participating in first professional and master's and doctoral programs compared to graduates who parents had high school education, controlling for other factors.

- Bachelor's graduates with more than two years of full-time work experience had lower odds of pursuing further post-secondary education than did graduates with no full-time work experience at the time of graduation, controlling for other factors.

- Five years after graduation, 1990 bachelor's graduates who were working full-time had median earnings of $37,000, while 1990 master's graduates earned $46,000, and 1990 doctoral graduates earned $50,000.

Résumé

Des bacheliers diplômés en 1990, près de 60 % avaient entrepris ou terminé d'autres études postsecondaires en 1995, cinq ans après l'obtention de leur diplôme. Plus des trois quarts des diplômés qui avaient entrepris d'autres études postsecondaires l'avaient fait en 1992, soit au cours des deux années qui ont suivi l'obtention du baccalauréat. Près d'un tiers des diplômés qui ont poursuivi des études postsecondaires ont entrepris des programmes de maîtrise ou de doctorat, tandis que près d'un quart des étudiants se sont inscrits à des programmes collégiaux et à des programmes de formation professionnelle ou à des programmes du baccalauréat.

Cette étude contribue aux recherches sur l'apprentissage continu en s'intéressant à la population des étudiants d'université canadiens qui ont poursuivi leurs études universitaires ou ont entrepris d'autres études postsecondaires après avoir obtenu leur diplôme d'un programme de baccalauréat en 1990, en utilisant les données de l'Enquête nationale de 1992 auprès des diplômés de 1990 (END) et de l'Enquête de suivi (1995) auprès des diplômés de 1990. Cette étude examine l'incidence des facteurs sociodémographiques et de ceux liés aux inscriptions sur les chances de poursuivre différents programmes d'études postsecondaires.

- On a constaté que le champ d'étude est un prédicteur clé de la participation à d'autres études postsecondaires, après avoir tenu compte des autres prédicteurs. Il s'est avéré moins probable que les diplômés des champs d'étude qui sont assortis d'emplois particuliers tels l'éducation, le commerce, l'administration et les affaires, le génie et les professions du domaine de la santé poursuivent leurs études postsecondaires que les diplômés des programmes de sciences sociales.

- Les hommes avaient plus de chances de participer à des programmes de maîtrise et de doctorat que les femmes, après avoir tenu compte des autres prédicteurs.

- Les diplômés dont les parents étaient titulaires d'un diplôme universitaire avaient plus de chances de participer aux programmes de premier grade professionnel, de maîtrise et de doctorat que les diplômés dont les parents avaient fait des études secondaires, après avoir tenu compte des autres facteurs.

- Il s'est avéré moins probable que les bacheliers ayant plus de deux années d'expérience de travail à plein temps poursuivent des études postsecondaires que les diplômés n'ayant pas d'expérience de travail à plein temps au moment de l'obtention du diplôme, après avoir tenu compte des autres facteurs.

- Cinq ans après l'obtention du diplôme, les bacheliers de 1990 qui travaillaient à plein temps avaient un salaire médian de 37 000 $, tandis que les titulaires d'une maîtrise de 1990 gagnaient 46 000 $ et les titulaires d'un doctorat de 1990, 50 000 $.

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1. Introduction

In today's knowledge based-economy, human resource development has been identified as crucial for success in the labour market and for the development of a strong Canadian economy. In the 1990s, lifelong learning has become a common strategy for dealing with changing types of knowledge and skills demanded in the workplace. The Conference Board of Canada identified life-long learning as an important employability skill (McLaughlin, 1992). Post-secondary education, has been targeted as a critical component of life-long learning strategies, in conjunction with workplace training.

This study contributes to the research literature on life-long learning by examining the population of Canadian university students who pursued further/additional post-secondary education after graduating from bachelor's level programs[1] in 1990, using data from the 1992 National Graduates Survey of 1990 graduates (NGS) and the 1995 Follow-up of 1990 Graduates Survey (FOG). This study examines how social demographic and enrolment-related factors affect the odds of pursuing different types of further post-secondary education.

The primary focus of research on the NGS and FOG has been on the labour market outcomes and experiences of university graduates. The issue of further education has not received much attention by researchers who have analyzed the various NGS and FOG surveys. Most of the published NGS information on further education has been limited to profile reports of the proportion of graduates from various post-secondary programs who participated in further postseondary education and the types of further education taken, with gender breakdowns (Clark, Laing, Rechnitzer, 1986: Clark, 1986; Little and Lappierre, 1996; Paju, 1997). Research from provincial surveys of university graduates done in Alberta (Krahn and Lowe, 1998) and the Atlantic Provinces (Baseline Market Research, 1998) are also limited to a presentation of brief profile results. Clark (1997) produced a more in-depth profile analysis of the NGS graduating class of 1986 five years after graduation. The study looked at differences in further post-secondary education by gender, age, field of study, marital status and the presence of dependent children for all types of post-secondary graduates. However, the analysis failed to control for the

[1] Research is currently underway which examines further post-secondary education for 1990 master's graduates and 1990 community college graduates.

level of education that the graduates had prior to entering the program of graduation in 1986. This is an important issue because the program that students graduated from in 1986 may be a second or third post-secondary degree, and hence is actually part of a further education pathway. By simply examining "graduates," one mixes up students who have no previous post-secondary education with those with previous post-secondary degrees, diplomas, or certificates, but who graduated from the same program in 1986. Previous level of educational attainment may impact on the likelihood of pursuing further education after graduating from the program in 1986. In addition, Clark's analysis did not have multivariate controls for a number of factors related to pursuing post-secondary education.

2. Data and Methodology

Bachelor's graduates: a restricted population

This study selected only the population of 1990 bachelor's graduates. From this population only students with the following characteristics were selected for analysis:

a) The previous level of education was high school or community college/CEGEP;

b) Age at graduation was 26 or less;

c) Graduates started their bachelor's programs between 1984 and 1987.

The original intention was to restrict the population to students whose previous level of education was no post-secondary education. However, if this restriction was imposed all the graduates from Quebec would be eliminated since CEGEP graduation is a prerequisite for university admission in Quebec. However, 93% of bachelor's graduates who had college/CEGEP as the highest level of previous education graduated from Quebec universities. In effect, this preserves the original intent by selecting students with high school or the CEGEP equivalent in Quebec, as the highest level of previous education.

With the age restriction removed, graduates who were 26 years of age or less accounted for nearly 90% of the graduate population whose previous level of education was high school or community college/CEGEP and who started their bachelor's programs between 1984 and 1987.

There were 5,450 students in this restricted bachelor's population. This group of bachelor's graduates represented 60,771 graduates after the application of sample weights.

The National Graduates Surveys

The National Graduates Surveys (NGS), sponsored by Human Resources Development Canada and conducted by Statistics Canada, are specifically designed to obtain information on the relationship between education/training and labour market activities, the long-term labour market experiences of graduates, the employment, earnings, occupation and additional educational experiences and qualifications of graduates. The NGS focus on individuals who had obtained a degree, diploma or certificate from a trade/vocational school, a career/technical college (or CEGEP) or a university, and who were still living in Canada at the time of the survey. The NGS files are representative of the underlying graduate population in Canada.

Background

Statistics Canada conducted a first survey in 1978 on the labour market experiences of 1976 graduates from universities and community colleges in Canada. In 1984, a similar survey, the NGS of 1982 graduates was sponsored jointly by the Department of the Secretary of State and Employment and Immigration Canada and conducted by Statistics Canada. This survey expanded on the content of the previous survey and extended the population base to include graduates of trade/vocational programs in addition to graduates from community colleges and universities.

Since 1982, four cohorts of graduates have been surveyed. Every cohort was interviewed two and five years after graduation.

Year of graduation	First interview	Follow-up interview
1982	1984	1987
1986	1988	1991
1990	1992	1995
1995	1997	2000

The 2000 Follow-up Survey of the 1995 Graduates included a 'brain drain' component. Those who graduated in 1995 but who were living in the United States in June 2000 were included in the survey.

Objectives

The survey's key data objectives are:

- To obtain information for labour market analysis;
- To obtain information on the relationship between education/training and labour market experiences and the exposure of graduates to additional learning opportunities;
- To extend available information required to improve occupational supply and demand projection models and to conduct related studies of supply-demand imbalances in the labour market;
- To extend available information required to improve occupational supply and demand projection models and to conduct related studies of supply-demand imbalances in the labour market;
- To obtain data regarding longer-term market experiences of graduates;
- To obtain information on labour market experiences of members of target groups (such as women, visible minorities, native people, and persons with disabilities);

- To gain a better understanding of school-work transitions and returns to human capital;
- To gain a better understanding of post-secondary education financing;
- To obtain more detailed information on knowledge and skills.

Methodology

The National Graduates Surveys were based on a stratified systematic random sample design. For each province, the graduate population was stratified into five education levels: trade/vocational (skilled trades), career/technical (college), undergraduate, master's level and doctorate. The levels were subsequently stratified into nine fields of study for those who had taken a college program and ten fields for trade/vocational and university graduates. These fields of study classifications were based on the 5-digit USIS (University Student Information System) and CCSIS (Community College Student Information System) codes used by Statistics Canada. The sample allocation to the strata was made to assure acceptable levels of detail and therefore acceptable data reliability for the provinces, education levels and fields of study.

A total sample was selected for every cohort of graduates. Interviewers attempted to contact all graduates in the sample, initially using the telephone numbers provided by their institution. On average for every cohort, 73% of the total sample selected were contacted and interviewed. The same individuals were contacted again for the follow-up interview.

Year of graduation	Total sample selected	Year of survey	Usable sample (response rate)
1982	49,150	1984	35,717 (73%)
		1987	31,167
1986	53,136	1988	40,814 (77%)
		1991	35,401
1990	51,111	1992	36,280 (71%)
		1995	35,816
1995	61,759	1997	43,040 (70%)
		2000	To be completed

For more detailed information on methodology, see:

Clark, Warren, Margaret Laing and Edith Rechnitzer (1986). *The Class of 82: Summary Report on the Findings of the 1984 National Survey of the Graduates of 1982,* Secretary of State and Statistics Canada.

Clark, Warren (1991). *The Class of 1986: A Compendium of Findings of the 1988 National Graduates Survey of 1986 Graduates with Comparisons to the 1984 National Graduates Survey,* Employment and Immigration Canada and Statistics Canada, Catalogue LM-198E92.

Little, Don and Louise Lapierre (1996). *The Class of 90: A Compendium of Findings from the 1992 National Graduates Survey of 1990 Graduates,* Human Resources Development Canada and Statistics Canada, Catalogue SC-125-12-96E.

Taillon, Jacques and Mike Paju (1999). *The Class of '95: Report of the 1997 National Survey of 1995 Graduates*, Human Resources Development Canada and Statistics Canada, Catalogue SP-121-04-99.

Social-demographic and enrolment-related factors affect the odds of participating in further/additional post-secondary education

A multinomial logistic regression model[2] was used to assess how social-demographic and enrolment-related variables affect the odds of participating in further or additional post-secondary education. This model assesses how each of the predictors affect the odds ofparticipation in further post-secondary education, while holding constant the effect of all the other predictors in the model. The enrolment-related predictors include: field of study, region of university attended, full-time or part-time enrolment status, coop education status, and amount of student loan at time of graduation. The social-demographic predictors[3] are: gender, age at graduation, parent's highest level of education, visible minority status, and number of months of full-time work experience.[4] Previous level of educational attainment was also restricted in order to include students who had no previous post-secondary education before enrolling in the bachelor's program from which they graduated (see NGS methodology box for a more detailed explanation). All predictors were captured in the 1992 National Graduates Survey and refer to the period that the student was enrolled in the program from which they graduated from in 1990 or prior to this period. Information on the further post-secondary education variable was gathered in 1992 and again in 1995 (see the methodology box on the definition of further post-secondary education).

The logistic regression model is called multinomial because multiple comparisons are made between different types of further post-secondary participation *(college/trade-vocational versus*

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2 This model was estimated using the SAS CATMOD procedure. Further information on logistic regression can be found in Hosmer and Lemeshow (1989).

3 Marital status was not included in the social demographic predictors because 1990 graduates were asked about their marital status in 1992. The date of marriage was not captured, so that graduates could have been married after graduation in 1990, especially since the graduates were aged 26 or less at time of graduation. The marriage may have occurred during or after the period in which further education was taken. Unless we can establish a specific date or marriage the question of temporal sequence with further education is always in doubt. Only a small proportion of graduates reported the presence of dependent children. This is not surprising given the age of graduates at time of graduation, and when children who were born after graduation were removed, the sample size was too small to use this as a predictor variable.

4 The issue of how post-graduation labour market experiences affect the odds of pursuing further education could not be examined for graduates who took further education by 1992 because the temporal sequence of these two events could not be established. It was possible to look at the group of graduates who were in the labour market by 1992 but did not take further education until 1995. Unfortunately, 80% of graduates who took further education did so by 1992, leaving only a small group to examine for the labour market and further post-secondary education link.

no further post-secondary participation, university certificate/diploma versus no further post-secondary participation, bachelor's versus no further post-secondary participation, first professional versus no further post-secondary participation, master's or doctoral versus no further post-secondary participation) rather than simply looking at further post-secondary participation versus no further post-secondary participation. Combining different types of further post-secondary education into a single variable could lead to misleading results, because the effect of many of the predictors on further post-secondary comparison depends on the type of comparison being made. The initial contrasts for the logistic regression are between different types of further education and no further post-secondary education. This is followed by an examination of the graduates who took additional post-secondary education. Comparisons are made between different types of further education using master's and doctoral education as the contrast group,[5] rather than no additional education *(college/trade-vocational versus master's or doctoral participation, university certificate/diploma versus master's or doctoral participation, bachelor's versus master's or doctoral participation, and first professional versus master's or doctoral participation*).

For each predictor variable, one category was chosen as the reference group, against which all other categories were compared. For example, social science was chosen as the reference category for field of study: therefore all other fields of study were compared with social science. The estimated odds of pursuing master's or doctoral studies versus not pursuing further post-secondary education was .202 times or 80% lower for commerce, management and business graduates compared to social science graduates,[6] while holding constant the effects of all other predictors in the model. In comparison with the reference group, odds ratios greater than 1 indicate an increase in the odds, while odds ratios less than 1 indicate a decrease in the odds. An odds ratio of 1 indicates no effect on the odds of pursuing additional education.

In addition to the multivariate odds ratios mentioned above, bivariate odds ratios are also presented (Tables 2 and 4). Bivariate odds ratios do not control for the effects of the other predictors as is the case for multivariate odds ratios. For example, women had higher odd (1.43)

[5] These odds ratios were extracted from the original odds ratios using no further education as the comparison group. The contrast between no further education versus master's or doctoral programs is not reported in these odds ratios, since it is part of the original master's or doctoral programs versus no further education odds ratios.

[6] Odds ratios can be expressed as percentages 100(odds ratio-1). For example 100(.206-1)=80%.

of pursuing further bachelor's studies versus no further education, but this effect disappeared when controlling for the effect of other predictors variables. **Unless otherwise mentioned, odds ratios presented below always refer to multivariate odds ratios**.

Specification of the Multinomial Logistic Regression Model

Logistic regression: this model expresses the conditional log odds of pursuing further post-secondary education as a linear function of a set of explanatory or predictor variables. Since the multinomial model, used in this study builds on the binary model both models are presented below.

The binary logistic regression model:

$\text{Log}(Pi/1-Pi) = \text{LogPPi} = \alpha + b1\,(\text{gender}) + b2\,(\text{field study}) \ldots + bk\,(K)$

The multinomial logistic regression model:

$\text{LogPP}^{\text{cc/tv-no}} = \alpha + b1^{1}\,(\text{gender}) + b2^{1}\,(\text{field study}) \ldots + bk^{1}\,(K),$

$\text{LogPP}^{\text{unct-no}} = \alpha + b1^{2}\,(\text{gender}) + b2^{2}\,(\text{field study}) \ldots + bk^{2}\,(K),$

$\text{LogPP}^{\text{bach-no}} = \alpha + b1^{3}\,(\text{gender}) + b2^{3}\,(\text{field study}) \ldots + bk^{3}\,(K),$

$\text{LogPP}^{\text{fprof-no}} = \alpha + b1^{4}\,(\text{gender}) + b2^{4}\,(\text{field study}) \ldots + bk^{4}\,(K),$

$\text{LogPP}^{\text{ma/phd-no}} = \alpha + b1^{5}\,(\text{gender}) + b2^{5}\,(\text{field study}) \ldots + bk^{5}\,(K).$

Definition of terms for logistic regression models above:

Log = natural logarithm.

Odds = the relative probability of falling into one of two categories of interest.

Pi = the conditional probability of pursuing further post-secondary education.

1-Pi = the conditional probability of not pursuing further post-secondary education, given the predictors in the model.

α = a constant term.

b1...bk = logistic regression coefficients

$b1^{1}$ = superscript indicates the equation number for the multinomial logistic regression parameter.

LogPPi = the conditional odds of pursuing further post-secondary education versus no participation, given the predictor variables in the model.

Gender = predictor variable

Field study = field of study of bachelor's graduation in 1990=predictor variable

K = all other predictor variables in the model.

of pursuing further bachelor's studies versus no further education, but this effect disappeared when controlling for the effect of other predictors variables. **Unless otherwise mentioned, odds ratios presented below always refer to multivariate odds ratios.**

Specification of the Multinomial Logistic Regression Model

Logistic regression: this model expresses the conditional log odds of pursuing further post-secondary education as a linear function of a set of explanatory or predictor variables. Since the multinomial model, used in this study builds on the binary model both models are presented below.

The binary logistic regression model:

$\text{Log}(Pi/1-Pi) = \text{LogPPi} = \alpha + b1\,(\text{gender}) + b2\,(\text{field study}) \ldots + bk\,(K)$

The multinomial logistic regression model:

$\text{LogPP}^{\text{cc/tv-no}} = \alpha + b1^{1}\,(\text{gender}) + b2^{1}\,(\text{field study}) \ldots + bk^{1}\,(K),$

$\text{LogPP}^{\text{unct-no}} = \alpha + b1^{2}\,(\text{gender}) + b2^{2}\,(\text{field study}) \ldots + bk^{2}\,(K),$

$\text{LogPP}^{\text{bach-no}} = \alpha + b1^{3}\,(\text{gender}) + b2^{3}\,(\text{field study}) \ldots + bk^{3}\,(K),$

$\text{LogPP}^{\text{fprof-no}} = \alpha + b1^{4}\,(\text{gender}) + b2^{4}\,(\text{field study}) \ldots + bk^{4}\,(K),$

$\text{LogPP}^{\text{ma/phd-no}} = \alpha + b1^{5}\,(\text{gender}) + b2^{5}\,(\text{field study}) \ldots + bk^{5}\,(K).$

Definition of terms for logistic regression models above:

Log = natural logarithm.

Odds = the relative probability of falling into one of two categories of interest.

Pi = the conditional probability of pursuing further post-secondary education.

1-Pi = the conditional probability of not pursuing further post-secondary education, given the predictors in the model.

α = a constant term.

b1...bk = logistic regression coefficients

$b1^{1}$ = superscript indicates the equation number for the multinomial logistic regression parameter.

LogPPi = the conditional odds of pursuing further post-secondary education versus no participation, given the predictor variables in the model.

Gender = predictor variable

Field study = field of study of bachelor's graduation in 1990=predictor variable

K = all other predictor variables in the model.

$LogPP^{cc/tv-no}$ = the conditional odds of taking community college/trade-vocational education versus no further post-secondary participation, given the predictor variables in the model.

$LogPP^{unct-no}$ = the conditional odds of taking a university certificate or diploma versus no further post-secondary participation, given the predictor variables in the model.

$LogPP^{bach-no}$ = the conditional odds of taking bachelors level education versus no further post-secondary participation, given the predictor variables in the model.

$LogPP^{fprof-no}$ = the conditional odds of taking a first professional degree versus no further post-secondary participation, given the predictor variables in the model.

$LogPP^{ma/phd-no}$ = the conditional odds of taking a Master's or doctoral degree versus no further post-secondary participation, given the predictor variables in the model.

Additional issues: for the multinomial logistic regression model, there are five equations for the log of each separate odds (community college/trade-vocational versus no further post-secondary participation, university certificate or diploma versus no further post-secondary participation, bachelor's level versus no further post-secondary participation, first professional versus no further post-secondary participation, and Master's of doctoral level versus no further post-secondary participation), which are simultaneously estimated by maximum likelihood using the CATMOD procedure in SAS. The number of equations generated is equivalent to the number of categories in the post-secondary education variable minus 1. We could also have specified equations for the comparison between the log odds of master's or doctoral level versus community college/trade-vocational level, or bachelor's level versus Master's of doctoral level, and so forth. The parameters for these comparisons can be obtained as the differences between the parameters in the original three equations. Odds ratios are produced by exponentiation of the logistic regression parameters.

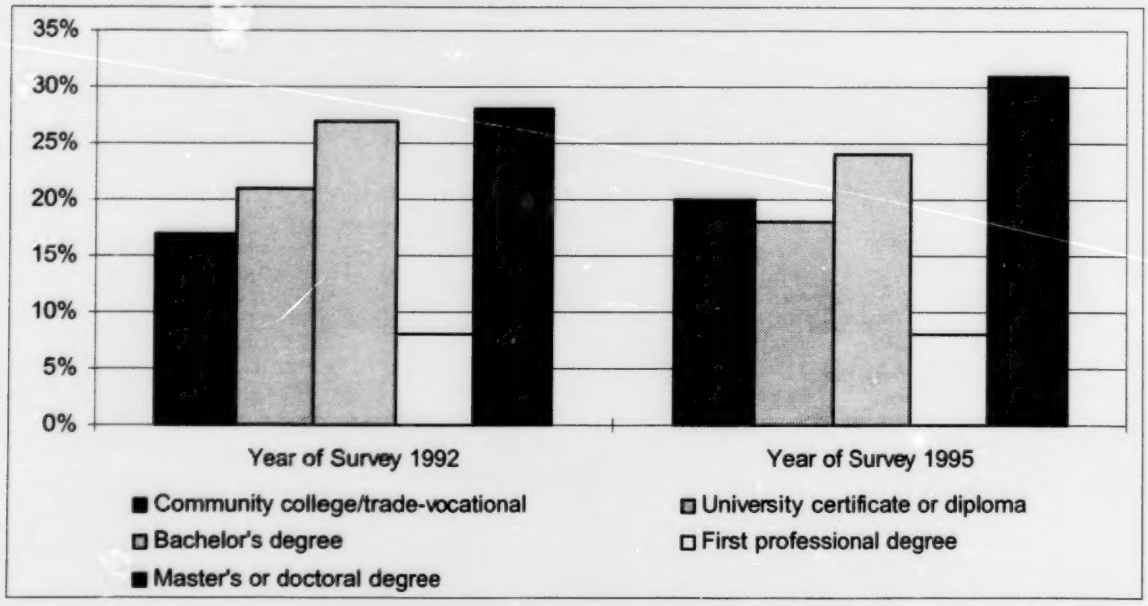
See Hosmer and Lemeshow (1989) for further information on the logistic regression model.

3. Pursuing Further Education

Nearly two-thirds of bachelor's graduates participated in further post-secondary education five years after graduating

Over three-quarters of graduates who took further post-secondary education did so by 1992, within two-years after graduation. Two years after graduation 47% of bachelor's graduates had participated in further post-secondary education, and this increased to 59% five years after graduation in 1995. An examination of the population of graduates, who took further post-secondary education, shows that the proportion in the five types of post-secondary education was very similar at two years and five years after graduation (Graph 1). In 1995 31% of graduates who participated in further post-secondary education took programs at the master's or doctoral level, followed by 24% at the bachelor's level, 20% at the college/trade-vocational level, 18% at the university certificate/diploma level and 8% at the first professional level.

Graph 1 **Type of Further Post-secondary Education Taken by 1990 Bachelor's Graduates**



Data source: the 1992 National Survey and the 1995 Follow-Up Survey of 1990 Graduates. The 1990 bachelor's population was restricted to graduates with the following characteristics:

1) The previous level of education was high school or community college/CEGEP;
2) Age at graduation was 26 or less;
3) Graduates started their bachelor's programs between 1984 and 1987.

Measurement of Further Education

In 1992, graduates were asked:

a) Since you completed the program in 1990, have you **completed** any other university, college or trade-vocational degree, diploma or certificate programs? Information is then recorded on the types of degrees, diplomas or certificates, the field of study and the month and date in which the program requirements were completed.

b) Since you completed the program in 1990, have you **taken** any other credit courses, including correspondence courses? Information is recorded on the types of degrees, diplomas or certificates that these courses are good for. Field of study information is also recorded, but the dates in which the courses are taken are not recorded.

In 1995, graduates were asked:

a) Have you **completed** any other university, college or trade-vocational degree, diploma or certificate programs since June 1992? Information is then recorded on the types of degrees, diplomas or certificates, the field of study and the month and date in which the program requirements were completed. (Question repeated to capture multiple instances of completed degrees , diplomas or certificates)

b) Since June 1992 have you **taken** any other courses, workshops, seminars, tutorials correspondence courses or any other training or education? Were any of these courses job related? Did any of these job-related courses last more than 20 hours or more? For the most recent job-related course lasting 20 hours or more, could it lead to a degree, certificate or diploma? The type of degree, certificate or diploma is recorded, but no dates are recorded. (Question repeated to capture multiple instances of courses taken that lasted over 20 hours that could lead to a degree , diploma or certificate)

Definition of further education: the highest level of further education taken or completed by 1995 was the measure selected for this study:

- Community college/trade-vocational
- University certificate or diploma[a]

- Bachelor's degree
- First professional degree
- Master's or doctoral degree
- No further education

Taking or completing multiple instances of further education was not an issue for this population of bachelor's graduates five years after graduation. Bachelor's graduates were broken down into three groups: (1) those who had taken further education in 1992, but not completed any further education; (2) those who had completed further education by 1992; and those who had not completed or taken any further education by 1992. The pathways of these three groups to taking and completing further education in 1995 were constructed and it was found that multiple instances of additional education were statistically rare. Additionally, the bachelor's who did not take any further education since graduating in 1990 comprised almost half of all graduates, so the sample size was very limited for a study of multiple instances of additional education. The question for taking further education changed from 1992 to 1995, seen above. The restrictions that a course taken be job-related 20 hours per week, was not captured in 1992. This adds additional complications when looking at instances of multiple types of further education taken.

[a] Odds ratios can be expressed as percentages 100(odds ratio-1). For example 100(.206-1) = 80%

Master's graduates had higher annual earnings five years after graduating than bachelor's graduates

Since bachelor's graduates were more likely to pursue master's and doctoral programs than any other further post-secondary education option, it is important to look at the employment earnings consequences of earning a master's or doctoral degree. This issue can be examined by comparing 1990 bachelor's graduates with 1990 master's, and 1990 doctoral graduates who were working at a full-time job five years after graduation. Restrictions[7] were imposed in order to make the bachelor's, masters and doctoral populations more comparable. Graduates from all levels were selected who were less than 35 years of age at time of graduation, had less than five years of full-time work experience, and who had not completed any additional post-secondary

[7] The bachelor's population was further restricted to those who had less than a bachelor's degree before entering the bachelor's program from which they graduated from in 1990. The master's population was restricted to those who had a bachelor's degree or less when entering the master's program from which they graduated in 1990.

- Bachelor's degree
- First professional degree
- Master's or doctoral degree
- No further education

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education after graduating in 1990.[8] For example, it would be inappropriate to include bachelor's graduates who went on to complete a master's degree with bachelor's graduates who had not completed any further post-secondary education. Selecting graduates with less than five years of full-time work experience makes it easier to assess the earnings effects of obtaining a bachelor's versus graduate degree, because work experience is highly correlated with earnings.

In 1995, bachelor's graduates who were working full-time had median annual earnings of $37,000,[9] while master's graduates earned $46,000, and doctoral graduates earned $50,000. This provides evidence of a substantial ($9,000) earnings benefit to obtaining a master's degree versus a bachelor's degree. Without restrictions on age at graduation and number of years of full-time work experience there was a $13,000 earnings differential between the bachelor's and master's level. There is a much smaller earnings benefit ($4,000) from obtaining a doctoral degree versus a master's degree.

While all master's graduates had an earnings benefit compared to bachelor's graduates, there was considerable variation by field of study (Graph2). Five years after graduating master's graduates from commerce, management and business programs had a $17,000 earnings advantage compared to bachelor's graduates. Master's graduates from social sciences and education, recreation and counseling programs had a $9,000 earnings advantage compared the their counterparts at the bachelor's level, while master's graduates from humanities and fine arts earned $6,000 more than bachelor's graduates. Master's graduates from agricultural and biological science, engineering, and health sciences had a $5,000 earnings advantage over their bachelor's level counterparts. Master's graduates from math and physical sciences had the lowest earnings advantage ($4,000) compared to other fields of study.

In addition to earnings, there is also the issue of the extent to which graduates[10] use the skills they acquired during their programs in their jobs. In 1995, 47% of master's graduates said that in their current job they used the skills acquired in their master's programs to a great extent, while

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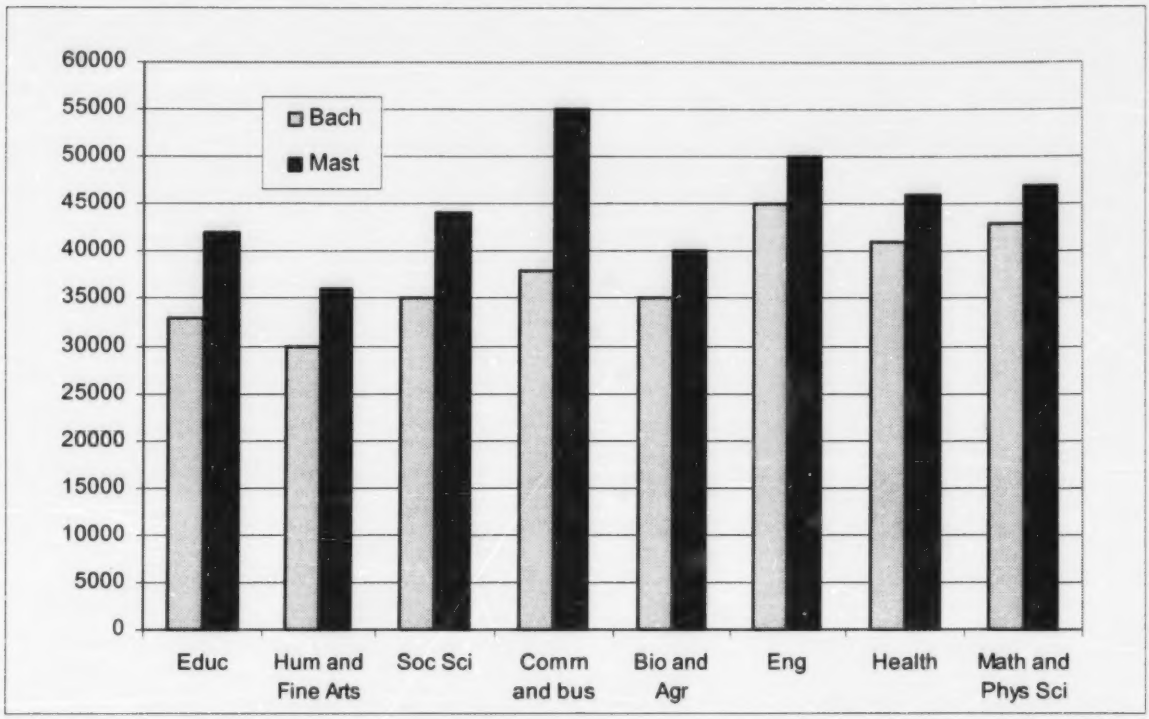
8 Finnie (2000) uses similar restrictions for examining earnings by field of study for university graduates.

9 All discussions of earnings refers to median annual earnings.

10 The same population restrictions used for the earnings section are used for this issue of skills used in one's current job. In 1995 graduates were asked: In this job, to what extent did you use any of the skills acquired from the educational program you completed in 1990? 1) to a great extent, 2) to some extent, 3) very little, 4) not at all.

40% said that they used their skills to some extent. In comparison, only 31% of bachelor's graduates said that they used the skills acquired in their bachelor's programs in their current job, while 46% said that they used their skills to some extent.

Graph 2 **Median Annual Earnings for Bachelor's and Master's Graduates in 1995 by Field**



Data source: the 1992 National Survey and the 1995 Follow-Up Survey of 1990 Graduates. Population restricted to bachelor's and master's graduates who were less than 35 years of age at time of graduation, had less than five years of full-time work experience and who had not completed any additional post-secondary education after graduating in 1990.

It is important to note that even though bachelor's graduates were more likely to choose master's and doctoral program compared to other further post-secondary education options, only 18% of all bachelor's graduates participated in master's and doctoral programs by 1995.

Bachelor's graduates from commerce, management and business programs had lower odds of participating in further education (controlling for other factors)

Social science was selected as the comparison group for the analysis presented below, because it contains a large number of fields of study (sociology, economics, geography, anthropology, political science) that do not have a specific job associated with them. In contrast, graduates

from fields such as engineering, nursing, occupational therapy or teaching are able to work in specific jobs for which they are trained.

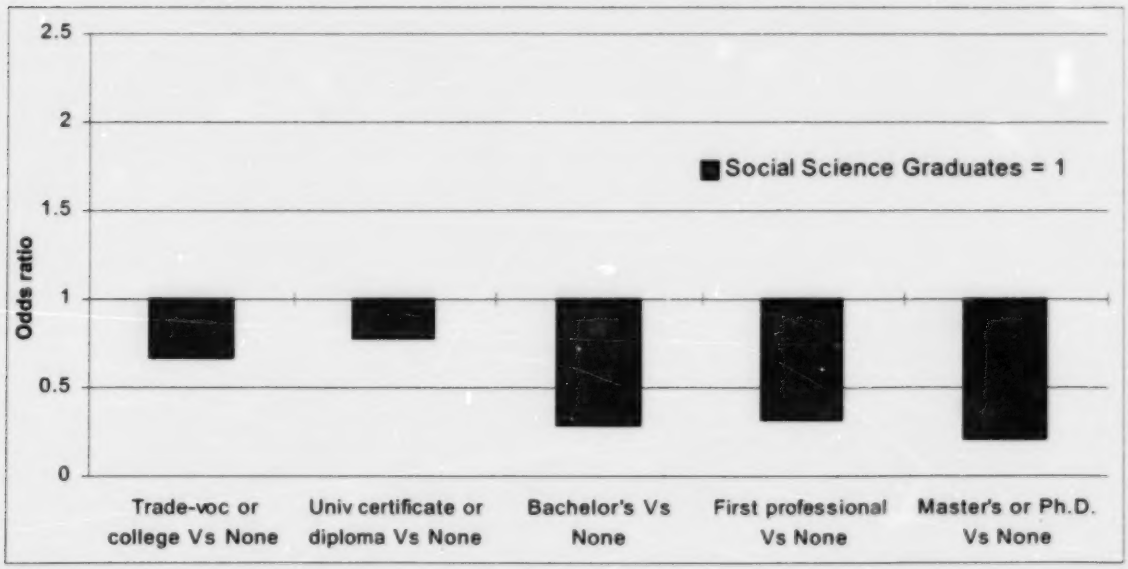
Multinomial logistic regression results show that students who graduated from education, recreation and counseling programs[11] had sharply lower odds of participation in college/trade-vocational (.42), bachelor's (.82), first professional (.32) and master's or doctoral programs (.40) *versus no further post-secondary participation* compared to social science graduates (Table 1). These results demonstrate the effect that a job-specific field of study has on lowering the odds of participation in further post-secondary education. It is interesting to note that both education, recreation and counseling and social science graduates who completed a master's degree had a $9,000 earnings advantage over bachelor's graduates. However, education, recreation and counseling graduates were less likely to pursue masters and doctoral studies compared to social science graduates. Education, recreation and counseling graduates who took further post-secondary programs had higher odds of participation in university diploma/certificate (2.7) and bachelor's (2.1) programs versus *master's or doctoral programs* when compared to social science graduates (Table 3).

Graduates of fine arts or humanities programs were 1.4 times more likely to take a university certificate/diploma versus no further post-secondary participation compared to social science graduates. However, there were no other differences in the odds of further post-secondary participation *versus no further post-secondary participation* compared to social science graduates. Fine arts or humanities graduates who took additional post-secondary education were .78 times less likely to take college/trade-vocational education *versus master's or doctoral programs* compared to social science graduates, but this was the only difference. The majority of students in fine arts and humanities field are humanities students and nearly three quarters of these students studied history or English/French language and literature. Most of the disciplines in the humanities/fine arts and social science fields lack job-specific characteristics, and hence it is not surprising that there is barely any difference in the odds of pursing further post-secondary education when comparing these two groups.

[11] Counseling in this context refers to education related counseling services. Psychology is part of the social science field of study. Education graduates make up the majority of the education, recreation and counseling field of study.

Commerce, management and business graduates had lower odds of participating in college/trade-vocational (.67), university diploma/certificate (.78) bachelor's (.29), first professional (.33) and master's or doctoral programs (.20) *versus no participation in further education* compared to social science graduates. While the commerce, management and business category includes specialized administrative studies and secretarial science, 98% of students in this field came from the commerce, management and business disciplines. The latter disciplines have very clear job-specific characteristics, such as accounting, finance management and so forth compared to social science disciplines. In addition, it may be easier for commerce, management and business graduates to find a job compare to social science graduates, given the practical job-oriented nature of their programs. This is partly reflected in the finding that social science graduates were more likely to be unemployed (12%) two years after graduation compared to commerce, management and business graduates (9%). However, despite a $17,000 earnings differential between commerce, management and business master's and bachelor's graduates, these bachelor's graduates had strongly lower odds of participation in master's or doctoral programs compared to social science graduates.

Graph 3 **Odds of Taking Further Post-secondary Education for Bachelor's Graduates of Commerce, Management and Business**



Data source: the 1992 National Survey and the 1995 Follow-Up Survey of 1990 Graduates. The 1990 bachelor's population was restricted to graduates with the following characteristics:

1) The previous level of education was high school or community college/CEGEP;
2) Age at graduation was 26 or less;
3) Graduates started their bachelor's programs between 1984 and 1987.

Commerce, management and business graduates who took further post-secondary education had higher odds of college/trade-vocational (3.3), university diploma/certificate (3.8), bachelor's (1.4), and first professional (1.6) participation *versus master's or doctoral programs* compared to social science graduates. This finding showing that commerce, management and business graduates have higher odds of participating in all types of post-secondary education versus master's or doctoral participation again shows a tendency for more job-specific types of further education, particularly in the case of college/trade-vocational, university diploma/certificate, and first professional programs.

Agricultural and biological science graduates had higher odds of participation in university diploma/certificate (1.4), first professional (2.5) and master's or doctoral (1.6) programs *versus no participation in further education* programs compared to social science graduates. The differences in the odds of further education between graduates from these two fields of study may be due in part to a difficult labour market for graduates from agricultural and biological sciences. These latter graduates had a 16% unemployment rate two years after graduation, compared to 12% for social science graduates. Agricultural and biological science graduates who took further post-secondary education had lower odds of participation in college/trade-vocational (.65) and bachelor's (.69) *versus master's or doctoral programs* compared to social science graduates. However, these graduates were 1.5 times more likely to have taken first professional programs *versus master's or doctoral participation* compared to social science graduates.

Engineering and applied science graduates had lower odds of participating in college/trade-vocational (.61), university diploma/certificate (.54), bachelor's (.31), first professional (.15) and master's or doctoral (.67) programs versus no further post-secondary participation in education compared to social science graduates. Again, we see the effect of fields of study with job-specific characteristics on the odds of pursuing further education. Engineering and applied science graduates who took further post-secondary had lower odds of participating in bachelor's (.46) and first professional (.23) *versus master's or doctoral programs* compared to social science graduates.

Graduates from health professional programs had lower odds of participating in college/trade-vocational (.52), university diploma/certificate (.57) bachelor's (.20), and master's or doctoral

programs (.21) *versus no participation in further education* compared to social science graduates. These findings are very similar to the ones for engineering and applied science graduates, and likely for the same job specific reasons. Graduates from health professional programs who took further post-secondary education had higher odds of participating in college/trade-vocational (2.5), university diploma/certificate (2.7) and first professional (3.2) *versus master's or doctoral programs* compared to social science graduates. These findings show further studies at the master's and doctoral level are less likely than other options, which is the opposite to the case for engineering and applied science graduates.

Math and physical science graduates had lower odds (around .60) of participating in college/trade-vocational, university diploma/certificate, bachelor's, and first professional programs versus no participation in further post-secondary education compared to social science graduates. However, there were no differences in the odds of additional post-secondary education between math and physical science graduates who took further post-secondary education *versus master's or doctoral participation* compared to social science graduates.

The above results show that graduates from fields of study which are job-specific have lower odds of pursuing further post-secondary education compared to social science graduates. In addition, graduates from fields of study which are job-specific who pursue further post-secondary education have higher odds of taking programs other than master's and doctoral programs (with the exception of engineering and applied science graduates) compared to social science graduates.

Bachelor's graduates from Atlantic universities had lower odds of pursuing college/trade-vocational education (controlling for other factors)

Graduates from Atlantic region universities[12] had lower odds of participation in community college/trade-vocational (.63) versus no participation in further education programs compared to graduates from Ontario universities. However, this was the only difference in the odds of pursuing further post-secondary education for these graduates. Graduates from Atlantic region universities who took further education were .71 times less likely to take college/trade-vocational

[12] The incidence of interprovincial student migration in the population of bachelor's graduates was very low, and with the collapsing to regional categories this issue was no longer important.

education *versus master's or doctoral programs* compared to graduates from Ontario universities. These differences may be due, in part, to the greater availability of community colleges in Ontario.

Graduates from Quebec universities had lower odds of participating in college/trade-vocational (.57), bachelor's (.61) and first professional programs (.67) *versus no participation in further post-secondary education* compared to graduates from Ontario universities. The lower odds of participation at the college level is not unexpected, since the CEGEP system in Quebec is a university transfer program, as well as a terminal stream, which is mainly directed at high school graduates. However, Quebec graduates had higher odds of participating in university diploma/certificate (2.5) and master's or doctoral program (1.7) versus no participation in further post-secondary education compared to graduates from Ontario universities. Graduates from Quebec universities who took further education had sharply lower odds (around .35) of participating in college/trade-vocational, bachelor's, and first professional programs *versus master's or doctoral programs* compared to graduates from Ontario universities. However, Quebec graduates who took further post-secondary education were 1.5 times more likely to take university certificate/diploma programs *versus master's or doctoral participation* compared to graduates from Ontario universities.

Graduates from the Western[13] universities had lower odds of participating in college/trade-vocational (.74), university diploma/certificate (.56), and bachelor's (.68) programs versus no participation in further post-secondary education compared to graduates from Ontario universities. Graduates from Western universities who took further post-secondary education were .58 times less likely to take a university certificate/diploma *versus master's or doctoral programs* compared to graduates from Ontario universities.

Graduates from British Columbia universities were nearly 2 times more likely to participate in university diploma/certificate programs versus no participation in further post-secondary education compared to graduates from Ontario universities, but there were no other differences in the odds of participation in further education for these graduates. Graduates from British Columbia universities who took further post-secondary education were 2.2 times more likely to

[13] Refers to Manitoba, Saskatchewan, and Alberta.

take a university certificate/diploma *versus master's or doctoral programs* compared to graduates from Ontario universities.

Bachelor's graduates who studied part-time had lower odds of participating in master's or doctoral programs (controlling for other factors)

Bachelor's graduates who studied part-time[14] were 1.6 times more likely to take a university certificate or diploma versus *no further post-secondary participation* compared to graduates who studied on a full-time basis. However, graduates who studied part-time had lower odds of participating in first professional programs (.47) and master's or doctoral programs (.62) versus no further post-secondary participation compared to graduates who studied full-time. Graduates who studied part-time cited having a full-time or part-time job, lack of finances, reasons other than heath problems, family responsibilities, the program being offered part-time, wanted a break for school, and only needed a few coursed to graduate, as the most common reason for not studying full-time. It seems likely that factors such as full-time employment and lack of financial resources would influence the odds of pursuing further post-secondary education.

Bachelor's graduates who studied part-time and took further education had higher odds of taking college/trade-vocational (1.8), university certificate/diploma (2.6), and bachelor's (1.7) programs *versus master's or doctoral programs* compared to graduates who studied full-time.

Participation in the coop education option had no impact on the odds of pursuing further education (controlling for other factors)

Participation in the coop education option did not affect the odds of participating in further post-secondary education. These findings are somewhat unexpected because one would think that coop students may have a stronger orientation toward direct entry into the labour market following graduation than non-coop students. However, the bivariate odds ratios show that, *without controls*, graduates who took the coop education option had lower odds of participation in college/trade-vocational (.73), university diploma/certificate (.61), and bachelor's (.48), programs *versus no participation in further post-secondary education* compared to graduates who did not take the coop education option (Table 2). For coop graduates who took further education, there were no differences in the odds of taking different types of further *education*

[14] This category includes students who studied part-time only and those who combined full-time and part-time studies.

versus taking master's or doctoral programs compared to graduates who did not take the coop education option. However, at the bivariate level, coop students who did take further education, had lower odds of taking a university certificate/diploma (.65) and a bachelor's degree (.51) *versus taking master's or doctoral programs* compared to graduates who did not take the coop education option.

Graduates with $15,000 or more in student loans had higher odds of participating in master's and doctoral programs (controlling for other factors)

Graduates with less than $15,000 in student loans[15] were just as likely to pursue further post-secondary education *versus no further post-secondary education* compared to students with no student loans. However, graduates with $15,000 or more in student loans had higher odds of participating in bachelor's (1.4), first professional (2.2) and master's and doctoral program (1.8) *versus no further post-secondary education* compared to students with no student loans. The amount of student loan at time of graduation was included as a predictor in the model, because it was thought that a large student loan may be an impediment to further post-secondary education. This is largely because of the pressure to repay the loan and the danger of increasing the size of the loan by pursuing further education. However, it is also possible that pursuing further post-secondary education would temporarily postpone the repayment of the loan. In addition, the size of student loan may also draw in students who are strongly committed to long term educational goals, such as graduate or first professional degree, and who are willing to accumulate a significant student loan in order to achieve this goal. This may be part of the explanation for higher odds of participation in first professional and master's and doctoral programs versus no further post-secondary participation.

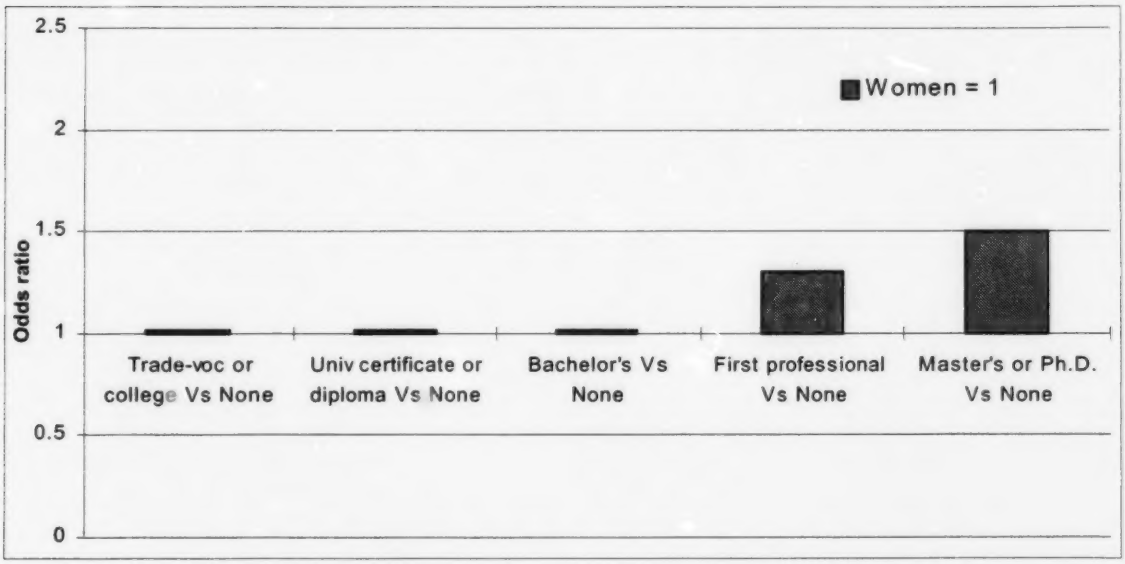
Graduates with more than $15,000 in student loans who took further post-secondary education were .56 times less likely to take college/trade-vocational or university certificate/diploma programs *versus master's or doctoral programs* compared to graduates who had no student loans.

[15] Student loans refer to loans from all sources at the time of graduation in 1990.

Men had higher odds of participating in master's and doctoral programs (controlling for other factors)

Men had higher odds of participation in first professional (1.3) and master's and doctoral programs (1.5) versus *no further post-secondary participation* compared to women. The latter finding is not surprising since 55% of the class 1990 master's graduates who were less than 35 years of age at graduation were women.[16] Nearly 90% of graduates who took further education in the combined master's and doctoral category were master's students, so the gender effect is not due primarily to differential participation rates at the doctoral level. Any gender differences in the odds of participating in master's or doctoral programs are important to note given the $9,000 earnings benefit for obtaining a master's degree versus a bachelor's degree.

Graph 4 **Odds of Taking of Further Post-secondary Education for Bachelor's Graduates Who Were Men**



Data source: the 1992 National Survey and the 1995 Follow-Up Survey of 1990 Graduates. The 1990 bachelor's population was restricted to graduates with the following characteristics:

1) The previous level of education was high school or community college/CEGEP;
2) Age at graduation was 26 or less;
3) Graduates started their bachelor's programs between 1984 and 1987.

[16] For 1990 master's graduates who were between 35 and 40 years of age at graduation 46% were men, and this dropped to around 40% for graduates who were 41 years of age or older at graduation. However it is important to bear in mind that 70% of 1990 master's graduates were less than 35 years of age at time of graduation. Nearly 70% of 1990 doctoral graduates age 40 or less were men, but there were no gender differences for doctoral graduates 41 years of age or older.

As noted previously, master's graduates are also more likely to work in jobs in which they use the skills acquired during their education to a great extent compared to bachelor's graduates. The finding about first professional programs is surprising since 55% of the class of 1990 first professional graduates were women. Since a bachelor's degree is not a prerequisite for entry into first professional programs such as medicine, dentistry and law, there may be a difference in the population of students who enter first professional programs after first graduating from a bachelors program compared to those who enter without a bachelor's degree. It is important to note that at the bivariate level there is no difference in the odds of pursuing first professional programs for women versus men, but the difference appears when the other predictors are held constant. An examination of other bivariate odds ratios shows that men have lower odds of participating in university certificate/diploma (.81) and bachelor's (.70) programs versus no further post-secondary participation compared to women – these effects disappear when controls are introduced. Men who took further post-secondary education had lower odds of participating in college/trade-vocational (.62), university certificate/diploma (.67) and bachelor's (.62) programs *versus master's or doctoral programs* compared to women.

Younger graduates more likely to pursue further post-secondary education (controlling for other factors)

The age of the student was controlled, to some extent, by limiting the analysis to students who were 26 years of age or less at graduation in 1990. Just over 60% of these students were between 22 and 23 years of age when they graduated in 1990. Despite this restriction, age at graduation was still an important predictor of further post-secondary education. Age at entry to the bachelor's program (influenced by variations in high school diploma or university transfer time requirements, taking time off between high school and university), the length of bachelor's program (three years versus four years), as well as time to bachelor's program completion (full-time or part-time status, changing fields of study) are key factors behind age at graduation. Students from Quebec, Ontario, and British Columbia were more likely to have graduated in the 22 to 23 age range compared to students from other provinces who more often graduated in the 21 to 22 age range. This is likely the result of grade 13 in Ontario, and the university transfer systems in Quebec and British Columbia.

Students who were 21 years of age at graduation had higher odds of participating in bachelor's (1.5), first professional (1.7) and master's and doctoral (1.3) programs *versus no further post-secondary participation* compared to graduates who were 22 years of age when graduating. However, students 21 years of age at graduation who took further education were .71 times less likely to take college/trade-vocational education *versus master's or doctoral programs* compared to graduates who were 22 years of age.

Students 23 years of age at graduation had lower odds of participating in college/trade-vocational (.83), bachelor's (.77), first professional (.63) and master's or doctoral programs (.79) *versus no further post-secondary participation* compared to graduates who were 22 years of age when graduating. There were no differences between the odds of participation in different types of further education *versus master's or doctoral programs.*

Students 24 years of age at graduation had lower odds of participating in college/trade-vocational (.78), university certificate/diploma (.56) bachelor's (.75), first professional (.20) and master's or doctoral level (.56) *versus no further post-secondary participation* compared to graduates who were 22 years of age when graduating. However, students 24 years of age at graduation who took further education were around 1.4 times more likely to take college/trade-vocational education and bachelor's programs *versus master's or doctoral programs* compared to graduates who were 22 years of age. These same graduates were .36 times less likely to take first professional *versus master's or doctoral programs* compared to graduates who were 22 years of age.

Students 25 to 26 years of age at graduation had lower odds of participating in college/trade-vocational (.64), bachelor's (.69), first professional (.42) and master's or doctoral level (.46) *versus no further post-secondary participation* compared to graduates who were 22 years of age when graduating. However, students 25 to 26 years of age at graduation who took further education had higher odds of participating in university certificate/diplomas (1.7) and bachelor's programs (1.5) versus *master's or doctoral programs* compared to graduates who were 22 years of age.

Graduates whose parent(s) had a university degree had higher odds of participating in master's and doctoral programs

Bachelor's graduates whose parents[17] had less than a high school diploma were around .76 times less likely to participate in college/trade-vocational education and master's or doctoral programs *versus no further post-secondary participation* compared to graduates whose parents had college/trade-vocational education.[18] For graduates who took further post-secondary education, those whose parents had less than high school education were 1.4 times more likely to take university certificate/diploma programs *versus master's or doctoral programs* compared to graduates whose parent's had college/trade-vocational education.

Similarly, graduates with high school educated parents had lower odds of college/trade-vocational (.76) and master's or doctoral (.78) participation *versus no further post-secondary participation* compared to graduates whose parent's had college/trade-vocational education. For graduates who took further post-secondary education, those whose parents had a high school education were no more likely to take the various types of post-secondary programs *versus master's or doctoral programs* compared to graduates whose parents had college/trade-vocational education.

There were no differences in the odds of participation in further education *versus no further post-secondary participation* for graduates whose parents had a university certificate or diploma[19] compared to graduates whose parent's had college/trade-vocational education. Similarly, for graduates who took further post-secondary education, those whose parents had a university certificate or diploma were no more likely to take the various types of post-secondary programs *versus master's or doctoral programs* compared to graduates whose parents had college/trade-vocational education.

Graduates whose parents had a bachelor's or first professional degree had higher odds of participating in bachelor's (1.3), first professional (1.6) and master's and doctoral (1.5) programs *versus no further post-secondary participation* compared to graduates whose parent's had

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17 Parent's level of educational attainment refers to the highest level of either parent.

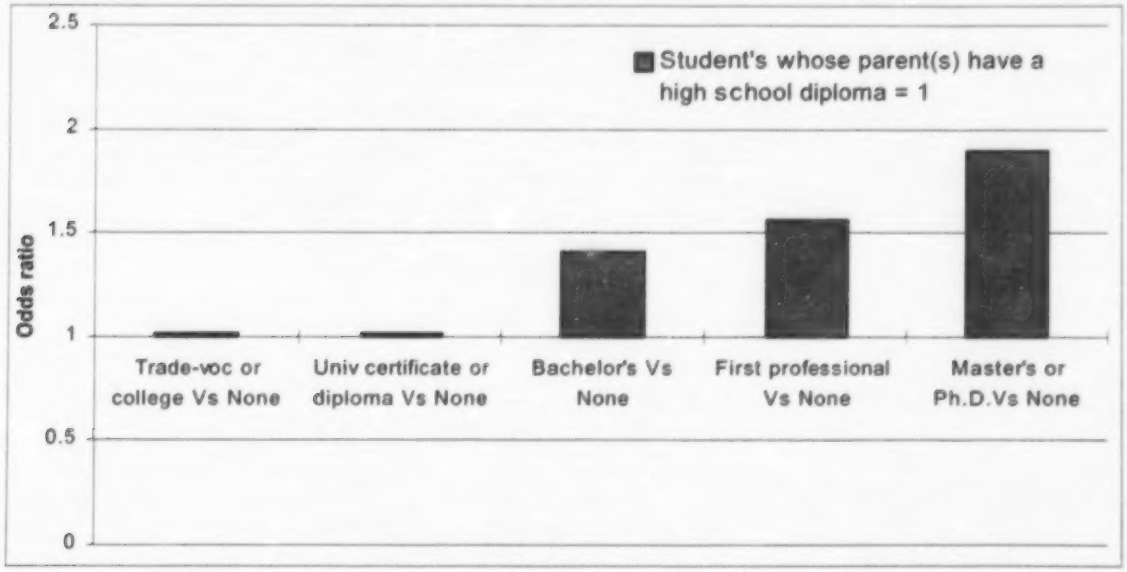
18 Includes parents with some trade-vocational or community college/CEGEP.

19 This category also includes teacher's certificates and some university.

college/trade-vocational education. Additional comparisons show that graduates whose parents had a bachelor's or first professional degree were 2 times more likely to participate in masters and doctoral studies versus no further post-secondary participation compared to graduates whose parents had a high school education (Graph 5). Just over 40% of graduates had parents with high school education or less.

For graduates who took further post-secondary education, those whose parents had a bachelor's or first professional degree had lower odds of participating in college/trade-vocational (.64) or university certificate/diploma (.65) programs versus *master's or doctoral programs* compared to graduates whose parent's had college/trade-vocational education.

Graph 5 **Odds of Taking Further Post-secondary Education for Bachelor's Graduates Whose Parent(s) Have A Bachelor's Degree**



Data source: the 1992 National Survey and the 1995 Follow-Up Survey of 1990 Graduates. The 1990 bachelor's population was restricted to graduates with the following characteristics:

1) The previous level of education was high school or community college/CEGEP;
2) Age at graduation was 26 or less;
3) Graduates started their bachelor's programs between 1984 and 1987.

Graduates whose parents had a master's or doctoral degree had higher odds of participating in bachelor's (1.9), first professional (3.0) and master's or doctoral (2.1) programs *versus no further post-secondary participation* compared to graduates whose parents had college/trade-vocational education. Other comparisons show that graduates whose parents had a master's or doctoral

degree were nearly 3 times more likely to participate in master's and doctoral studies versus no further post-secondary participation compared to graduates whose parents had a high school education.

For graduates who took further post-secondary education, those whose parents had a master's or doctoral degree had lower odds of participating in college/trade-vocational (.49) or university certificate/diploma programs (.62) *versus master's or doctoral programs* compared to graduates whose parent's had college/trade-vocational education.

The above results show that graduates whose parents education is high school or less have lower odds of pursuing master's or doctoral programs versus no further post-secondary participation compared to graduates whose parents had college/trade-vocational education. Graduates who had at least one parent with a university degree had higher odds of participation in further university education at the first professional and master's and doctoral level versus no further post-secondary education when compared to either graduates with high school or college/trade-vocational educated parents. These findings remain despite controlling for field of study, which was shown to be a crucial predictor of participation in further post-secondary education.

These findings parallel other research (Butlin, 1999) which shows that high school graduates with at least one university educated parent had much higher odds of university participation versus no post-secondary participation compared to students with high school educated parents. These latter findings corroborate a long-standing trend in the Canadian research literature showing a strong link between the socio-economic status of one's parents and participation in university education. The influence of parent's education on the odds of participation in graduate school raises an important issue given the $9,000 annual earnings differential between master's and bachelor's graduates and the issue of skill use on the job.

Visible minority status had little impact on the odds of pursuing further post-secondary education (controlling for other factors)

Guppy and Davies (1998), using 1991 Census data, found that visible minorities were more likely than non-visible minorities to have continued their education beyond 12 years of study. However, visible minority status had very little impact on the odds of pursuing further post-secondary education. Graduates who were members of a visible minority were 1.5 times more

likely to participate in community college/trade-vocational education *versus no further post-secondary participation* compared to graduates who were not members of a visible minority. The odds ratios without controls show that graduates who were members of a visible minority were .72 times less likely to take a university certificate/diploma *versus no further post-secondary participation* compared to graduates who were not members of a visible minority—this effect disappears when controls are introduced. Visible minority graduates who took further post-secondary education were 1.5 times more likely to participate in college/trade-vocational education v*ersus master's or doctoral programs* compared to graduates who were not members of a visible minority.

Bachelor's graduates with more than two years of work experience had lower odds of participating in master's and doctoral programs (controlling for other factors)

Graduates with up to 12 months of full-time work experience[20] were about 1.4 times more likely to participate in college/trade-vocational and first professional programs *versus no further post-secondary participation* compared to graduates with no full-time work experience. Graduates with up to 12 months of full-time work experience who took further post-secondary education had higher odds of participating in college/trade-vocational (1.6), university diploma/certificate (1.3), bachelor's (1.2), and first professional (1.5) programs v*ersus master's or doctoral programs* compared to graduates with no full-time work experience.

Graduates with 13 to 24 months of full-time work experience had lower odds of participation in college/trade-vocational (.81) and bachelor's (.61) programs *versus no further post-secondary participation* compared to graduates with no full-time work experience. Graduates with 13 to 24 months of full-time work experience who took further post-secondary education had lower odds of participating in bachelor's (.64) programs, but higher odds (1.4) of taking first professional programs v*ersus master's or doctoral programs* compared to graduates with no full-time work experience.

Graduates with 25 months or more of full-time work experience had lower odds of participation in university certificate/diploma (.67), bachelor's (.48) and master's or doctoral programs (.63) *versus no further post-secondary participation* compared to graduates with no full-time work

20 Full-time work is defined as ever having worked 30 hours or more per week at a job.

experience. Graduates with 25 months or more of full-time work experience who took further post-secondary education had higher odds of participating in college/trade-vocational (1.7) and first professional programs (2.1) *versus master's or doctoral programs* compared to graduates with no full-time work experience.

4. Conclusion

Nearly 60% of 1990 bachelor's graduates had taken or completed some further post-secondary education by 1995, five years after graduating. Over three-quarters of graduates who took further post-secondary education did so by 1992, within two-years after graduation. Nearly a third of graduates who took further post-secondary education took master's or doctoral programs, while close to a quarter of students took programs at either the college/trade-vocational or bachelor's degree level.

Field of study was found to be a key predictor of participation in further post-secondary education, controlling for other predictors. Graduates from fields of study that had a specific job associated with them, such as education, commerce, management and business, engineering, and health professions had lower odds of participation in further post-secondary education than graduates from social science programs. Men had higher odds of participation in master's and doctoral programs than women, controlling for other predictors. Graduates whose parents had a university degree had higher odds of participating in first professional and master's and doctoral programs compared to graduates who parents had high school education, controlling for other factors. On the other hand visible minority status had little impact on the odds of participation in further post-secondary education, controlling for other predictors. Finally, bachelor's graduates with more than two years of full-time work experience had lower odds of pursuing further post-secondary education than did graduates with no full-time work experience at the time of graduation, controlling for other factors.

Five years after graduation, 1990 bachelor's graduates who were working full-time[21] had median earnings of $37,000, while 1990 master's graduates earned $46,000, and 1990 doctoral graduates earned $50,000. Clearly there is a substantial earnings benefit associated with obtaining a graduate degree. The findings which show differences in the odds of participation in graduate school by gender and the educational attainment of bachelor's graduates parents raise the important issue of equity of access to graduate school and consequently to higher paying jobs. There is a large body of Canadian research showing that high school students with university

[21] See the earnings section in the text for information about restrictions imposed on the graduate population.

educated parents are much more likely to participate in university education compared to students whose parents do not have a university degree (Butlin, 1999). This study has shown that the educational attainment of one's parents continues to be an important factor among students who entered and graduated from the university system with regard to participation in master's and doctoral programs.

Appendix

Table 1 **Odds ratios from a multinomial logistic regression model of pursuing further education with education-related and social-demographic variables (Further education Vs None)[a]**

	Further Education				
	College/trade vocational Vs None	*University certificate/ diploma Vs None*	*Bachelor's degree Vs None*	*First professional degree Vs None*	*Master's and doctoral degree Vs None*
Predictors[b]					
Education, recreation, counselling	0.416	1.056[ns]	0.816**	0.317	0.397
Fine arts and humanities	0.908[ns]	1.354*	1.086[ns]	0.920[ns]	1.164[ns]
Social science[c]	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Commerce and business	0.673	0.780**	0.286	0.325	0.202
Agriculture and biological sciences	1.051[ns]	1.414**	1.115[ns]	2.454	1.629
Engineering and applied science	0.609	0.542	0.305	0.149	0.665
Health professions	0.520	0.572	0.195	0.664[ns]	0.208
Math and physical sciences	0.620	0.647*	0.640	0.614**	0.798[ns]
Region of university of graduation					
Atlantic region	0.626	1.128[ns]	.992[ns]	1.079ns	0.881[ns]
Quebec	0.572	2.539	0.614	0.668*	1.711
Ontario	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Western Provinces	0.738**	0.554*	-	0.797[ns]	0.958[ns]
British Columbia	1.178[ns]	1.899*	1.085[ns]	1.389[ns]	0.868[ns]
Full time/part-time status					
Studied part-time or full and part-time	1.132[ns]	1.608	1.077[ns]	0.467	0.620
Studied full-time	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Coop education					
Took coop education	0.920[ns]	0.859[ns]	0.743[ns]	1.095[ns]	1.047[ns]
Did not take coop education	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Amount of student loan at time of graduation					
No loan	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
$14,999 or less	0.920[ns]	1.098[ns]	1.004[ns]	0.980[ns]	1.045[ns]
$15,000 or more	1.015[ns]	1.015[ns]	1.393**	2.157	1.799
Gender					
Men	0.933[ns]	1.009[ns]	0.929[ns]	1.330*	1.503
Women	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Age at time of graduation in 1992					
21 years of age or younger	0.887[ns]	1.273[ns]	1.454	1.645	1.248**
22 years of age	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
23 years of age	0.830**	0.978[ns]	0.765*	0.627	0.790*
24 years of age	0.782**	0.553	0.745*	0.200	0.559
25 to 26 years of age	0.639	0.804[ns]	0.692*	0.419	0.463

Parent's highest level of education					
Some secondary or less	0.761**	1.063^{ns}	0.868^{ns}	0.732^{ns}	0.772*
High school diploma	0.767**	0.864^{ns}	0.906^{ns}	0.915^{ns}	0.779**
College or trade-vocational	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
University certificate or diploma or teachers college	0.969^{ns}	1.053^{ns}	1.027^{ns}	0.691^{ns}	0.778^{ns}
Bachelor's or first professional degree	0.941^{ns}	0.966^{ns}	1.285*	1.577*	1.476
Master's or doctoral degree	1.045^{ns}	1.334^{ns}	1.867	3.020	2.138
Visible minority status					
Visible minority	1.497	0.819^{ns}	0.804^{ns}	0.814^{ns}	1.036^{ns}
Not visible minority	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Number of months of full-time work experience					
No full-time work experience	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
12 month or less	1.357	1.104^{ns}	1.070^{ns}	1.331**	0.864^{ns}
13 months to 24 months	0.810**	0.909^{ns}	0.605	1.331^{ns}	0.959^{ns}
25 or more months	1.031^{ns}	0.671*	0.484	1.327^{ns}	0.625

[a] The global logistic regression model is significant at p=.0001

[b] The data for the logistic regression model come from the 1992 National Survey and the 1995 Follow-up Survey of 1990 Graduates. The sample weight from this survey take into account unequal probabilities of selection. The adjustment was done by dividing the weight variable by the average of the population included in the model. This adjustment does not correct for possible bias resulting from stratification or clustering in the sample design.

[c] The contrast group are indicated by bolding and a value of 1.000. Odds ratios greater than 1 indicate an increase in the odds of post-secondary participation, odds ratios less than 1 indicate a decrease in the odds of participation, and odds ratios=1 indicate no effect on the odds of participation.

Note: For the model presented above, the odds ratios reported are significant at p<=.01, unless otherwise noted.

* Difference with reference group at .01<p<=.05.

** Difference with reference group at .05<p<=.10.

ns Difference with reference group is not statistically significant

Table 2 **Bivariate odds ratios from a logistic regression model of pursuing further education with education-related and social-demographic variables (Further education Vs None)**

	College/trade vocational Vs None	*University certificate/ diploma Vs None*	*Bachelor's degree Vs None*	*First professional degree Vs None*	*Master's and doctoral degree Vs None*
Predictors[a]					
Education, recreation, counselling	0.358	1.176[ns]	0.732*	0.275	0.411
Fine arts and humanities	0.951[ns]	1.347*	1.151[ns]	0.994[ns]	1.185[ns]
Social science[b]	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Commerce and business	0.619	0.912[ns]	0.259	0.333	0.243
Agriculture and biological sciences	1.080[ns]	1.448**	1.121[ns]	2.767	1.814
Engineering and applied science	0.531	0.536	0.228	0.151	0.857[ns]
Health professions	0.528	0.604*	0.201	0.720[ns]	0.238
Math and physical sciences	0.601	0.652*	0.551	0.647[ns]	0.935[ns]
Region of university of graduation					
Atlantic region	0.604	1.120[ns]	1.072[ns]	1.407**	0.880[ns]
Quebec	0.513	2.316	0.462	0.482	1.24*
Ontario	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Western Provinces	0.700*	0.536*	0.627	0.980[ns]	0.977[ns]
British Columbia	1.371[ns]	1.977*	1.203[ns]	1.423[ns]	0.9720[ns]
Full time/part-time status					
studied part-time or full and part-time	1.153[ns]	1.468	0.996[ns]	0.352	0.540
Studied full-time	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Coop education					
Took coop education	0.731**	0.609	0.479	0.648[ns]	0.933[ns]
Did not take coop education	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Amount of student loan at time of graduation					
No loan	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
$14,999 or less	0.826*	1.078[ns]	0.887[ns]	0.769**	0.920[ns]
$15,000 or more	0.816[ns]	0.885[ns]	1.071[ns]	1.427[ns]	1.222[ns]
Gender					
Men	0.865[ns]	0.812*	0.699	0.964[ns]	1.314
Women	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Age at time of graduation in 1992					
21 years of age or younger	0.967[ns]	1.147[ns]	1.753	1.977	1.331
22 years of age	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
23 years of age	0.817**	0.982**	0.714	0.546	0.786
24 years of age	0.731*	0.637	0.686	0.173	0.597
25 to 26 years of age	0.591	0.920[ns]	0.539	0.364	0.489

Parent's highest level of education					
Some secondary or less	0.745*	1.153^{ns}	0.836^{ns}	0.676^{ns}	0.757*
High school diploma	0.800**	0.862^{ns}	0.924^{ns}	0.893^{ns}	0.764*
College or trade-vocational	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
University certificate or diploma or teachers college	0.939^{ns}	1.231^{ns}	1.005^{ns}	0.725^{ns}	0.818^{ns}
Bachelor's or first professional degree	0.969^{ns}	0.995^{ns}	1.230^{ns}	1.600*	1.474
Master's or doctoral degree	1.221^{ns}	1.304^{ns}	1.922	3.315	2.268
Visible minority status					
Visible minority	1.601	0.715**	0.804^{ns}	0.860^{ns}	1.089^{ns}
Not visible minority	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
Number of months of full-time work experience					
No full-time work experience	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
12 month or less	1.243*	1.156^{ns}	1.044^{ns}	1.447*	0.909^{ns}
13 months to 24 months	0.743	0.825^{ns}	0.538	1.249^{ns}	0.905^{ns}
25 or more months	0.871^{ns}	0.712*	0.438	0.898^{ns}	0.550

[a] The data for the logistic regression model come from the 1992 National Survey and the 1995 Follow-up Survey of 1990 Graduates. The sample weight from this survey take into account unequal probabilities of selection. The adjustment was done by dividing the weight variable by the average of the population included in the model. This adjustment does not correct for possible bias resulting from stratification or clustering in the sample design.

[b] The contrast group are indicated by bolding and a value of 1.000. Odds ratios greater than 1 indicate an increase in the odds of post-secondary participation, odds ratios less than 1 indicate a decrease in the odds of participation, and odds ratios=1 indicate no effect on the odds of participation.

Note: For the model presented above, the odds ratios reported are significant at $p<=.01$, unless otherwise noted.

* Difference with reference group at $.01<p<=.05$.

** Difference with reference group at $.05<p<=.10$.

ns Difference with reference group is not statistically significant.

Table 3 **Odds ratios from a multinomial logistic regression model of pursuing further education with education-related and social-demographic variables (Further education Vs Master's or doctoral degree)[a]**

	College/trade vocational Vs Master's or doctoral degree	*University certificate/ diploma Vs Master's or doctoral degree*	*Bachelor's degree Vs Master's or doctoral degree*	*First professional degree Vs Master's or doctoral degree*
Predictors[b]				
Education, recreation, counselling	1.047[ns]	2.650	2.055	0.798[ns]
Fine arts and humanities	0.778**	1.163[ns]	0.937[ns]	0.790[ns]
Social science[c]	**1.000**	**1.000**	**1.000**	**1.000**
Commerce and business	3.329	3.833	1.436**	1.605**
Agriculture and biological sciences	0.646*	0.870[ns]	0.686*	1.508*
Engineering and applied science	0.916[ns]	0.815[ns]	0.461	0.225
Health professions	2.513	2.737	0.935[ns]	3.179
Math and physical sciences	0.775[ns]	0.808[ns]	0.799[ns]	0.768[ns]
Region of university of graduation				
Atlantic region	0.710**	1.280[ns]	1.131[ns]	1.224[ns]
Quebec	0.334	1.484	0.359	0.390
Ontario	**1.000**	**1.000**	**1.000**	**1.000**
Western Provinces	0.771[ns]	0.579**	0.714[ns]	0.832[ns]
British Columbia	1.359[ns]	2.190*	1.251[ns]	1.602[ns]
Full time/part-time status				
Studied part-time or full and part-time	1.828	2.595	1.737	0.753[ns]
Studied full-time	**1.000**	**1.000**	**1.000**	**1.000**
Coop education				
Took coop education	0.878[ns]	0.820[ns]	0.704[ns]	1.046[ns]
Did not take coop education	**1.000**	**1.000**	**1.000**	**1.000**
Amount of student loan at time of graduation				
No loan	**1.000**	**1.000**	**1.000**	**1.000**
$14,999 or less	0.880[ns]	1.051[ns]	0.960[ns]	0.937[ns]
$15,000 or more	0.564	0.564	0.774[ns]	1.199[ns]
Gender				
Men	0.621	0.671	0.618	0.885[ns]
Women	**1.000**	**1.000**	**1.000**	**1.000**
Age at time of graduation in 1992				
21 years of age or younger	0.711*	1.020[ns]	1.165[ns]	1.318[ns]
22 years of age	**1.000**	**1.000**	**1.000**	**1.000**
23 years of age	1.050[ns]	1.238[ns]	0.968[ns]	0.794[ns]
24 years of age	1.398**	0.989[ns]	1.333**	0.358
25 to 26 years of age	1.379[ns]	1.736	1.494*	0.904[ns]

Parent's highest level of education				
Some secondary or less	0.985^{ns}	1.377**	1.122^{ns}	0.948^{ns}
High school diploma	0.981^{ns}	1.115^{ns}	1.161^{ns}	1.178^{ns}
College or trade-vocational	**1.000**	**1.000**	**1.000**	**1.000**
University certificate or diploma or teachers college	1.245^{ns}	1.347^{ns}	1.320^{ns}	0.888^{ns}
Bachelor's or first professional degree	0.638	0.654	0.870^{ns}	1.068^{ns}
Master's or doctoral degree	0.489	0.624*	0.870^{ns}	1.413^{ns}
Visible minority status				
Visible minority	1.446*	0.795^{ns}	0.779^{ns}	0.786^{ns}
Not visible minority	**1.000**	**1.000**	**1.000**	**1.000**
Number of months of full-time work experience				
No full-time work experience	**1.000**	**1.000**	**1.000**	**1.000**
12 month or less	1.570	1.278**	1.237**	1.540
13 months to 24 months	0.844^{ns}	0.948^{ns}	0.631	1.387**
25 or more months	1.648	1.073^{ns}	0.774^{ns}	2.122

[a] The global logistic regression model is significant at p=.0001

[b] The data for the logistic regression model come from the 1992 National Survey and the 1995 Follow-up Survey of 1990 Graduates. The sample weight from this survey take into account unequal probabilities of selection. The adjustment was done by dividing the weight variable by the average of the population included in the model. This adjustment does not correct for possible bias resulting from stratification or clustering in the sample design.

[c] The contrast group are indicated by bolding and a value of 1.000. Odds ratios greater than 1 indicate an increase in the odds of post-secondary participation, odds ratios less than 1 indicate a decrease in the odds of participation, and odds ratios=1 indicate no effect on the odds of participation.

Note: For the model presented above, the odds ratios reported are significant at p<=.01, unless otherwise noted.

* Difference with reference group at .01<p<=.05.

** Difference with reference group at .05<p<=.10.

^{ns} Difference with reference group is not statistically significant

Table 4 **Bivariate odds ratios from a logistic regression model of pursuing further education with education-related and social-demographic variables (Further education Vs Master's or doctoral degree)**

	College/trade vocational Vs Master's or doctoral degree	*University certificate/ diploma Vs Master's or doctoral degree*	*Bachelor's degree Vs Master's or doctoral degree*	*First professional degree Vs Master's or doctoral degree*
Predictors[a]				
Education, recreation, counselling	0.872[ns]	2.862	1.781	0.670[ns]
Fine arts and humanities	0.803[ns]	1.137[ns]	0.972[ns]	0.839[ns]
Social science[b]	**1.000**	**1.000**	**1.000**	**1.000**
Commerce and business	2.547	3.753	1.064[ns]	1.370[ns]
Agriculture and biological sciences	0.595	0.799[ns]	0.618	1.525*
Engineering and applied science	0.619	0.626*	0.266	0.176
Health professions	2.218	2.533	0.843[ns]	3.021
Math and physical sciences	0.642*	0.697[ns]	0.590	0.692[ns]
Region of university of graduation				
Atlantic region	0.685*	1.363[ns]	1.217ns	1.599*
Quebec	0.412	1.862	0.395	0.388
Ontario	**1.000**	**1.000**	**1.000**	**1.000**
Western Provinces	0.717**	0.549*	0.642*	1.004[ns]
British Columbia	1.412[ns]	2.034*	1.238[ns]	1.464[ns]
Full time/part-time status				
Studied part-time or full and part-time	2.134	2.718	1.844	0.652[ns]
Studied full-time	**1.000**	**1.000**	**1.000**	**1.000**
Coop education				
Took coop education	0.784[ns]	0.652*	0.514	0.695[ns]
Did not take coop education	**1.000**	**1.000**	**1.000**	**1.000**
Amount of student loan at time of graduation				
No loan	**1.000**	**1.000**	**1.000**	**1.000**
$14,999 or less	0.897[ns]	1.166[ns]	0.964[ns]	0.836[ns]
$15,000 or more	0.668*	0.725[ns]	0.876[ns]	1.167[ns]
Gender				
Men	0.658	0.618	0.532	0.734*
Women	**1.000**	**1.000**	**1.000**	**1.000**
Age at time of graduation in 1992				
21 years of age or younger	0.727*	0.862[ns]	1.317*	1.486*
22 years of age	**1.000**	**1.000**	**1.000**	**1.000**
23 years of age	1.039ns	1.248**	0.908[ns]	0.695*
24 years of age	1.225[ns]	1.067[ns]	1.150[ns]	0.290
25 to 26 years of age	1.208[ns]	1.881	1.101ns	0.745[ns]

Parent's highest level of education				
Some secondary or less	0.984^{ns}	1.523*	1.104^{ns}	0.893^{ns}
High school diploma	1.047^{ns}	1.128^{ns}	1.209^{ns}	1.168^{ns}
College or trade-vocational	**1.000**	**1.000**	**1.000**	**1.000**
University certificate or diploma or teachers college	1.148^{ns}	1.505**	1.228^{ns}	0.886^{ns}
Bachelor's or first professional degree	0.661	0.679*	0.840^{ns}	1.090^{ns}
Master's or doctoral degree	0.497	0.575	0.847^{ns}	1.462^{ns}
Visible minority status				
Visible minority	1.470	0.656*	0.738**	0.790^{ns}
Not visible minority	**1.000**	**1.000**	**1.000**	**1.000**
Number of months of full-time work experience				
No full-time work experience	**1.000**	**1.000**	**1.000**	**1.000**
12 month or less	1.367	1.272**	1.149^{ns}	1.593
13 months to 24 months	0.821^{ns}	0.912^{ns}	0.595	1.381**
25 or more months	1.585	1.295^{ns}	0.797^{ns}	1.633**

[a] The data for the logistic regression model come from the 1992 National Survey and the 1995 Follow-up Survey of 1990 Graduates. The sample weight from this survey take into account unequal probabilities of selection. The adjustment was done by dividing the weight variable by the average of the population included in the model. This adjustment does not correct for possible bias resulting from stratification or clustering in the sample design.

[b] The contrast group are indicated by bolding and a value of 1.000. Odds ratios greater than 1 indicate an increase in the odds of post-secondary participation, odds ratios less than 1 indicate a decrease in the odds of participation, and odds ratios=1 indicate no effect on the odds of participation.

Note: For the model presented above, the odds ratios reported are significant at p<=.01, unless otherwise noted.

* Difference with reference group at .01<p<=.05.

** Difference with reference group at .05<p<=.10.

ns Difference with reference group is not statistically significant

References

Barr-Telford, Geoff Bowlby and Warren Clark (1996). *The Class of 86 revisited: A compendium of findings of the 1991 Follow-up of 1986 Graduates Survey with comparisons to the 1998 National Graduates Survey*. Ottawa: Human Resources Development Canada and Statistics Canada.

Baseline Market Research Ltd. (1998). *Survey of 1996 University Graduates*. Prepared for the Maritime Provinces Higher Education Commission.

Butlin, George (1999). "Determinants of Postsecondary Participation," in *Education Quarterly Review*, Vol. 5, No. 3. Ottawa: Minister of Industry (Statistics Canada Catalogue no. 81-003-XPB).

Centre for Education Statistics (1997). *Strategic Plan 1997*. Ottawa: Statistics Canada.

Clark, Warren (1996). *The Class of 1986: A compendium of findings of the 1988 National Graduates Survey of 1986 Graduates with comparisons to the 1984 National Graduates Survey*. Ottawa: Employment and Immigration Canada and Statistics Canada.

Clark, Warren, Margaret Laing and Edith Rechnitzer (1986). *The Class of 86: Summary report on the findings of the 1984 National Survey of the Graduates of 1982*. Ottawa: Secretary of State and Statistics Canada.

Clark, Warren (1996). "Studies after graduation," in Barr-Telford, Geoff Bowlby and Warren Clark. *The Class of 86 revisited A compendium of findings of the 1991 Follow-up of 1986 Graduates Survey with comparisons to the 1998 National Graduates Survey*. Ottawa: Human Resources Development Canada and Statistics Canada, pp. 67-81.

Finnie, Ross (2000). *Earning differences by field of study amongst recent Canadian university graduates*. Forthcoming Applied Research Branch research paper R-00-1-5E. Ottawa: Human Resources Development Canada.

Guppy, Neil and Scott Davies (1998). *Education in Canada:Recent trends and future challenges*. Ottawa: Minister of Industry (Statistics Canada Catalogue no.C96-321-MPE).

Hosmer, David and Stanley Lemeshow (1989). *Applied Logistic Regression*. New York: Wiley & Sons.

Krahn, Harvey and Graham S. Lowe (1998). *Alberta Graduate Survey: Labour market and educational experiences of 1994 university graduates*. Minister of Alberta Advanced Education and Career Development.

Little, Don and Louise Lapierre (1996). *The Class of 90: a compendium of findings from the 1992 National Graduates Survey of 1990 Graduates*. Ottawa: Human Resources Development Canada and Statistics Canada (Catalogue no. SC-125-12-96E).

McLaughlin, Maryann (1992). *Employability skills profile: what are employers looking for?* Report 81-92E. Ottawa: The Conference Board.

Mouelhi, Mongi (1995). "University Enrollment Trends," in *Education Quarterly Review*, Vol. 2, No. 1 Spring. Ottawa: Minister of Industry (Statistics Canada Catalogue no. 81-003).

Paju, Michael (1997). *The Class of 90 Revisited: Report of the 1995 Follow-up Survey of 1990 Graduates*. Ottawa: Human Resources Development Canada and Statistics Canada (Catalogue no. MP43-366/1-1997).

Ralston, Helen (1978). "The uses of a bachelor's degree in sociology: Careers of recent graduates of a Maritime University," in *The Canadian Journal of Higher Education*, Vol. 8, No. 3: 48-62.

University Presidents' Council of British Columbia (1996). *Two year graduate follow-up survey of 1993 Baccalaureate graduates from BC's public universities: Major findings*. Vancouver.